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ORIGINAL ARTICLE

Urinary incontinence and sexual dysfunction in type 1 diabetic pregnant women: preliminary results

Incontinência urinária e disfunção sexual em gestantes diabéticas tipo 1: resultados preliminares

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Abstract

Introduction: Pregnancy and diabetes mellitus can promote various musculoskeletal disorders, predisposing individuals to urinary and sexual dysfunction. **Objective:** To evaluate the frequency of urinary incontinence and sexual dysfunction in pregnant women with type 1 diabetes. **Methods:** A cross-sectional, observational, analytical study was conducted. Thirteen pregnant women with type 1 diabetes were assessed from April 2017 to February 2018 using the International Consultation on Incontinence

Questionnaire-Short Form (ICIQ-SF) and the Female Sexual Function Index (FSFI). The statistical program SPSS version 20.1 was used for data analysis to determine the mean and standard deviation, central tendency and dispersion, and absolute (n) and relative (%) frequencies. The Pearson linear correlation test was used to evaluate the correlation between the ICIQ-SF and the FSFI. *Results:* The frequency of urinary incontinence was 38.5%, which produced a slight impact on the quality of life of pregnant women. The FSFI general score was 20.49, identifying the presence of sexual dysfunction (FSFI \leq 26). In the group of pregnant women, 92.3% (n = 12) presented sexual dysfunction, and the satisfaction and arousal domains showed a higher frequency of problems. The ICIQ-SF and FSFI showed a moderate but not significant correlation (r = 0.534, p = 0.60). The data exhibited a normal distribution according to Levene's test. *Conclusion:* The frequency of urinary incontinence in pregnant women with type 1 diabetes was low, but sexual dysfunction was present, and the satisfaction and arousal domains showed the highest frequency of problems.

Keywords: sexuality; urinary incontinence; diabetes mellitus.

Resumo

Introdução: A gestação e o diabetes mellitus promovem diversas alterações musculoesqueléticas, predispondo disfunções miccionais e sexuais. *Objetivo:* Avaliar a frequência de incontinência urinária e disfunção sexual em gestantes diabéticas tipo 1. *Métodos:* Estudo analítico, observacional do tipo transversal. Foram avaliadas 13 gestantes com diabetes do tipo 1 no período de abril 2017 a fevereiro 2018, por meio dos Questionários *International Consultation on Incontinence Questionnaire - Short Form* (ICIQ-SF) e o *Female Sexual Function Index* (FSFI). Foi utilizado o programa estatístico SPSS versão 20.1 para análise de dados, avaliando a média e desvio padrão (DP), tendência central e dispersão, frequência absoluta (n) e relativa (%). Para correlação entre o ICIQ e o FSFI o teste de correlação linear de Pearson. *Resultados:* Frequência de incontinência urinária foi 38,5%, o que demonstrou impacto leve na qualidade de vida das gestantes. O escore geral do FSFI foi de 20,49, identificando a presença de disfunção sexual (FSFI \leq 26). No grupo de gestantes, 92,3% (n = 12) apresentaram disfunção sexual, os domínios satisfação e excitação com maiores prevalências. Correlacionando o ICIQ-SF com FSFI, houve correlação moderada, mas não significativa (r = 0,534; p = 0,60). As amostras apresentaram distribuição normal de acordo com o teste de Levene. *Conclusão:* A frequência de incontinência urinária em gestantes diabéticas do tipo 1 foi baixa, mas houve presença de disfunção sexual, os domínios satisfação e excitação foram os mais frequentes.

Palavras-chave: sexualidade; incontinência urinária; diabetes mellitus.

Introduction

Diabetes mellitus type 1 (DM1) can occur at any age but usually manifests in individuals younger than 30 years, mainly during school age and adolescence [1]. It is a metabolic disease determined by defects in the secretion or action of insulin or both that cause chronic hyperglycemia with long-term damage, leading to dysfunction and failure in different organs [2].

The incidence of diabetes mellitus (DM) during pregnancy parallels its prevalence in women of reproductive age. It is estimated that 2-5% of all pregnant women are affected by DM and its maternal and fetal complications [3]. In addition to complications related to pregnancy, these women may also present an exacerbation of complications related to diabetes, such as retinopathies, neuropathies and chronic hypertension [2]. DM affects multiple organ systems including the urinary system in approximately 52% of diabetic patients and those with only hyperglycemia. Urinary incontinence (UI) is common among women with DM1, and risk factors may include advanced age, weight gain and previous urinary tract infection [4].

According to the International Continence Society, UI consists of involuntary loss of urine, which causes a public health problem that can negatively interfere with the quality of life of women [5]. Many risk factors are involved in the development of UI, but the association with DM is currently of great interest. The occurrence of UI during pregnancy is also high [6].

During pregnancy, the increase in maternal body weight and the weight of the gravid uterus increases the pressure on the pelvic floor muscles (PFMs). The increase in body mass index (BMI) during gestation, multiparity, vaginal delivery, prolonged time of the second period of labor and episiotomy are factors that decrease the strength of the PFMs and can cause UI and sexual dysfunctions (SDs) [5,7].

The presence of urinary symptoms as well as changes during the gestational period can modify sexual function of women, triggering some types of SDs [5].

Sexual health is also an important aspect of quality of life in women and is defined by the World Health Organization as a state of physical, emotional, mental and social well-being [8]. Women experience sexuality in different ways during various periods of life, especially during pregnancy, when sexual function and quality of life may be compromised due to alterations in their body image and lack of PFM recruitment [5,9]. In Brazil, two studies showed that the sexual function of healthy Brazilian pregnant women became more compromised as the time of delivery approached [4,10].

Both gestation and DM promote several musculoskeletal changes that lead to changes in PFM recruitment, predisposing women to voiding and SD. Thus, it is important to investigate the relationship between DM1 and gestation to prevent impairment of functionality and better target clinical interventions during the postpartum period.

The objective of this study is to determine the frequency of UI and SD in pregnant women with DM1.

Methods

This is an analytical, observational and cross-sectional study. It was conducted in the Physical Therapy Clinic of the Obstetric Clinic of the Clinics Hospital School of Medicine of the Universidade de São Paulo (FMUSP) from April 2017 to February 2018 and evaluated 13 pregnant women with DM1 through questionnaires.

This study was approved by the ethics and human research committee of the Universidade de São Paulo under number CAAE1.552.712 (approval date 05/20/2016). The participants were informed about the study and signed the informed consent form, in compliance with Resolution 466/2012 of the National Health Council.

Inclusion criteria

Pregnant women diagnosed with DM1; gestational age between 20 and 24 weeks; (period in which there is a physiological reduction of the PFM strength and a gradual stabilization of relaxing concentrations) [11]; single fetus gestation; age between 18 and 37 years old at the time of admission to the study, considered the ideal age for the reproductive period [12]; and all who read, agreed and signed the informed consent form.

Exclusion criteria

Important orthopedic changes (scoliosis, lower limb discrepancy) and neurological antecedents that caused cognitive impairment or motor deficits of the lower limbs.

We used convenience sampling to recruit participants who were patients in prenatal follow-up at the Endocrinopathy Outpatient Clinic. After they were included in this study, they were referred to an interview with the researching physiotherapist on the

day of the routine consultation. Those who were not available to be interviewed at that time were scheduled for the day of the next prenatal consultation.

Evaluation tools

The pregnant women were evaluated using questionnaires.

The identification questionnaire gathered information including sociodemographic data (age, gestational age, pre-gestational weight, current weight, height, education, marital status and profession) and health conditions (gestational history). The International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), which was translated and validated into Portuguese by Tamanini *et al.* [13], was used for UI evaluation. In a simple, brief and self-administered manner, the ICIQ-SF evaluates the frequency and amount of urine loss, the conditions of urine loss, the interference of this condition in activities of daily living, and the impact of UI on quality of life. The ICIQ-SF was chosen because of its suitability for Brazilian society. The questionnaire defines the results as follows: 0, no impact; 1 to 3, light impact; 4 to 6, a moderate effect; 7-9, severe impact and above 10, very severe impact [10].

The Female Sexual Function Index (FSFI) questionnaire which was translated and validated for Brazilian Portuguese pregnant women by Leite *et al.* [14] and aims to evaluate sexual function was used. It can be self-administered by women who have had sexual activity in the last four weeks. It consists of 19 questions that assess the female sexual response in six domains: sexual desire, sexual arousal, vaginal lubrication, orgasm, sexual satisfaction and pain. The response options are scored between 0 and 5, in an increasing manner, except for the questions about pain, in which the score is defined inversely. The total score is the sum of scores for each domain multiplied by the factor corresponding to each domain. The minimum score is 2, and the maximum score is 36 [11]. A total score less than or equal to 26 was considered a risk for SD.

Statistical analysis

The statistical analysis was performed using SPSS version 20.1 for Windows statistical software. Continuous variables are presented as means and standard deviations (sd) or are expressed as the central tendency and dispersion. Nominal categorical variables are presented as absolute (n) and relative (%) frequencies. Pearson's linear correlation test was used to examine the correlation between the ICIQ-SF and the FSFI. Levene's test was used to assess the normality of the data. A value of $p = 0.05$ was considered statistically significant.

Results

The sample analysis showed that the mean age of the 13 participants was 29.08 \pm 4.6 years old. The average gestational age for the participants at study enrollment was the 21 \pm 1.5st gestational week.

Table I shows the gestational history data; 38.46% (n = 5) of the participants were primiparas, and 61.53% (n = 8) were multiparas. These two groups had the same rate of normal deliveries 38.5% (n = 5) and cesarean deliveries 38.5% (n = 5), and abortion was reported in 23% (n = 3) of the participants. The majority of pregnant women had a stable partner (92.3%, n = 12); regarding education levels, 61.6% (8) of the participants had completed secondary school and had higher education. Regarding the BMI, the majority of the participants presented adequate weight (46.20%) (6), 38.50% (5) were underweight, 7.70% (1) were overweight and 7.70% (1) were obese.

The overall FSFI score was 20.49 \pm 3.38, which identified the presence of SD (FSFI \leq 26) in 92.3% (n = 12) of the pregnant women.

Table I - Analysis of sociodemographic data of pregnant women with type 1 diabetes (n = 13)

Variables	Fi	Fr (%)
Gestational history		
Normal birth	5	38.50
Cesarean delivery	5	38.50
Abortion	3	23.00
Body Mass Index (BMI)		
Low weight	5	38.50
Normal weight	6	46.20
Overweight	1	7.70
Obesity	1	7.70
Primipara	5	38.46
Multipara	8	61.53
Marital status		
With partner	12	92.3
Without partner	1	7.70
Education		
Secondary incomplete	2	15.4
Secondary complete	4	30.8
Higher education incomplete	2	15.4
Higher education complete	4	30.8
Technician	1	7.70

Fi = absolute frequency; Fr = relative frequency; % = percentage

Analysis of the results presented in Table II showed that the domains with higher prevalence of SD (domain score \leq 3.6) were related to satisfaction (84.61%, n = 11) and arousal (76.92%, n = 10), as they presented lower means in relation to the other evaluated domains.

The mean ICIQ-SF score was 3.85 \pm 5.843, demonstrating a slight impact of UI on participants' quality of life.

Table III describes question 6 of the ICIQ-SF questionnaire regarding the frequency of urinary loss. The responses "I lose urine when coughing or sneezing" and "I lose urine without an obvious reason" were stated by 23.1% (n = 3) and 15.4% (n = 2) of participants, respectively.

The ICIQ-SF and FSFI showed a moderate but not significant correlation ($r = 0.534$, $p = 0.60$).

Table II - Total score and FSFI domains in pregnant women, presented as the mean and standard deviation (n = 13)

Domains	Mean and standard deviation	Women with dysfunction	%
Total score	20.4 ± 3.38*	12	92.30
Desire	3.30 ± 1.00*	03	23.07
Arousal	3.30 ± 0.74*	10	76.92
Lubrication	3.94 ± 0.45	05	38.46
Orgasm	3.47 ± 0.50*	09	69.23
Satisfaction	2.30 ± 1.02*	11	84.61
Pain/discomfort	4.15 ± 2.07	01	7.69

* = domains that showed results below the cutoff point, predicting some type of sexual dysfunction

Table III - Analysis of question 6 (When do you lose urine?) of the ICIQ-SF in pregnant women with type 1 diabetes (n = 13)

Variable	Fi	Fr (%)
Never	8	61.5
I lose urine when I cough or sneeze	3	23.1
I lose urine for no obvious reason	2	15.4
Total	13	100.0

Fi = absolute frequency; Fr = relative frequency; % = percentage

Discussion

Although several studies have analyzed UI and sexual function during pregnancy, we did not find studies correlating UI with SD in pregnant women with DM1. Based on the results of the present study, the frequency of UI is low in pregnant women with DM1, and this caused a slight impact on their quality of life. However, SD was present in the majority of participants studied. The ICIQ-SF and FSFI values showed a moderate but not significant correlation ($r = 0.534$, $p = 0.60$).

According to a study by Marini *et al.* [4], UI was reported by 65% of women with DM1. Of these, 40% were very uncomfortable with their UI, and 9% believed that this negatively affected their daily activities; UI was characterized as more severe in women with DM. The present study did not observe a severe effect of UI in pregnant women with DM1, but it was associated with a negative impact on the participants' quality of life.

Moccellin *et al.* [16] studied 40 pregnant women aged between 18 and 40 years and found that pregnant women with UI reported that it had a negative impact on their quality of life compared to women without urinary loss. In the present study, we also

observed a negative impact of UI on the quality of life of pregnant women. This finding corroborated the findings of a study by Lopes and Higa [17], who analyzed 14 studies and demonstrated the effects of UI on quality of life. The results revealed that patients suffer social consequences, negative feelings and/or shame in 8% to 74% of cases, with moderate to severe impact on quality of life in 10% to 22% of patients. In addition, UI interfered in marital and sexual life in 7.5% to 33% of subjects.

Mathias *et al.* [5] conducted a survey to determine the frequency of UI and SD in women during the third trimester and in the sixth month postpartum. Among 54 participants, 37% had UI during the third gestational trimester, and 14.8% had UI six months postpartum. Regarding the frequency of SD, 42.6% and 32.6% of participants reported SD during pregnancy and after delivery, respectively. These values are consistent with the present study, which showed UI in 38.5% and SD in 92.3% of participants.

In this study, we observed a correlation between the ICIQ-SF and FSFI; that is, pregnant women with DM1 who presented UI showed a moderate chance of presenting a decrease in sexual quality of life, in some cases even giving up having intercourse. Those who still had intercourse had less satisfaction, perhaps due to the possibility of UI occurring during intercourse. UI leads to embarrassment and causes women to avoid sexual intercourse because of shame, and this may be one of the reasons why the arousal domain was diminished. We observed that not all women lose urine during intercourse, but the presence of UI causes women to prefer to avoid contact with their partner.

A study by Frigo *et al.* [18] found that UI can occur due to functional changes that may have an organic or psychosocial cause, possibly leading to development of SD, i.e., a total or partial blockage of the normal sexual response. Satisfaction in this aspect may be affected not only by the presence of physiological changes but also by the emotional consequences, loss of self-esteem, shame and feelings of social inadequacy. This corroborates the analysis of the current study, where a higher frequency of SD was observed in the domains arousal and satisfaction in pregnant women with DM1.

According to Rudge and Girão [6], DM is also associated with bladder dysfunction, including sensory abnormalities that result in impairment of bladder sensitivity, increased compliance and residual volume and the presence of UI and SD.

In contrast to the results of other studies, Mathias *et al.* [5] found that the relationship between BMI and parity aggravates or contributes to the development of UI. An association exists between weight gain as well as the number of previous deliveries and the prevalence of UI during the gestational period. The present study did not find any association between BMI and UI or SD.

Marini *et al.* [4] reported that during pregnancy, dysfunctions similar to DM occur, in which sexual function changes during gestation, leading to an increase in SD symptoms, such as decreased desire and dyspareunia. As the most prevalent SD types, hypoactive desire and sexual arousal were the most frequent symptoms that persisted during the postpartum period.

Literature demonstrates and our study finds evidence that SD can be caused by the presence of DM1 which, due to the extended period of high glycemia, can damage the nerves and blood vessels of the body leading to functional deficiencies in various organs, such as the sexual organs. In addition, difficulties in managing DM can also cause stress and depression, which can both decrease sexual desire. The use of antidepressant medications can decrease libido by interfering with sexual function. This analysis corroborates the findings of a study by Abdo [19] that reported that desire is regulated by important issues to women in addition to physiological changes, such as body self-image, mental health and marital relationship, and that women with genital arousal disorder may present estrogen deficiency or rarer conditions such as connective tissue disorder.

Lima *et al.* [20] evaluated the prevalence of SD before and during pregnancy in primiparas. Among 778 primiparas, 23.9% had SD before pregnancy, and 67.7% had SD during pregnancy. Before gestation, the rate of participants reporting a lack of sexual desire was 20.2%, and during pregnancy, the rate was 51%. Additionally, 29.1% of participants reported a decrease in vaginal lubrication during gestation; 1.2% reported dyspareunia before gestation; and 14.4% reported dyspareunia during gestation; 3.3% had sexual dissatisfaction before pregnancy, and 10.8% had sexual dissatisfaction during gestation. These results corroborate the present results regarding the lack of desire and satisfaction during pregnancy, which were more prevalent than problems in other domains.

Leite *et al.* [14] reported that the importance of sexual health for quality of life has been increasingly recognized in recent years. SD can have a greater impact on women's quality of life because diminishing sexual function can have damaging effects on self-esteem and interpersonal relationships, with frequent emotional burnout.

The information in the present study is fundamental when filling the gaps in the lack of studies which evaluate the frequency of UI and SD in Brazilian pregnant women with DM1, since in other populations such as pregnant women with DM2 and with low-risk pregnancy reported [21,22].

This study was the first to assess the frequency of pain and UI in Brazilian pregnant women with type 1 diabetes. Most studies in pregnant women with diabetes refer to gestational diabetes. It is also worth mentioning that these are preliminary results

and until the end of the data collection we may have more information to ascertain the data with greater clarity.

As in other studies, our research had limitations such as: the sample size, as it is a condition of low prevalence during pregnancy, around 1 to 2%; the absence of follow-up of these patients, which would make it possible to verify the impact of these changes on more advanced gestational ages; the fact that the frequency of these symptoms in the pre-pregnancy period is not evaluated, which could justify the increased frequency of this complaint; and the fact that we did not find studies with a similar research population to compare our findings.

In view of the above, it is expected that the frequency of UI and SD found in this study can demonstrate the importance of early diagnosis in pregnant women with DM1 to avoid future complications, as well as lead to the early implementation of strategic intervention measures for this population.

Conclusion

The frequency of urinary incontinence in pregnant women with type 1 diabetes was low, but sexual dysfunction was present, and the satisfaction and arousal domains showed the highest frequency of problems.

Potential conflict of interest

No potential conflicts of interest relevant to this article have been reported.

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There were no external funding sources for this study.

Authors' contribution

Research conception and design: Batista PA, Oliveira C, Francisco RPV; *Obtaining data:* Batista PA, Kaneto KC; *Data analysis and interpretation:* Batista PA, Oliveira C, Francisco RPV; *Statistical analysis:* Batista PA, Oliveira C; *Writing of the manuscript:* Batista PA; *Critical review of the manuscript for important intellectual content:* Oliveira C, Costa RA, Cabar FR, Tanaka C, Francisco RPV

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